World Journal of Current Medical and Pharmaceutical Research
Content available at www.wjcmpr.com ISSN: 2582-0222

THE IDEAL LENS FOR CATARACT PATIENTS IN THI-QAR PROVINCE

Ammar Adil Fahad
College of Health and Medical Technology, Al-Ayen University, Iraq

Article History

Received on: 28-05-2023
Revised on: 11-06-2023
Accepted on: 28-07-2023

Abstract

Cataract is a common age-related eye condition that affects millions of people worldwide, leading to impaired vision and decreased quality of life. The standard treatment for cataracts involves surgical removal of the cloudy lens and replacement with an intraocular lens (IOL). In recent years, significant advancements have been made in the development of ideal lenses for cataract patients, aiming to improve visual outcomes and address various visual challenges that patients may encounter post-surgery. Monofocal lenses provide excellent visual clarity at a fixed distance, either for near or distance vision, necessitating the use of glasses for other distances. Multifocal lenses, on the other hand, incorporate multiple focal points, reducing the dependency on glasses for various distances. However, they may introduce visual artifacts and reduce contrast sensitivity. EDOF lenses attempt to strike a balance, providing enhanced depth of focus while minimizing visual disturbances. Additionally, advancements in materials and technology have enabled the integration of premium features in these lenses, such as blue-light filtering, astigmatism correction, and enhanced durability, further enhancing patient satisfaction and long-term outcomes. This article also discusses the importance of personalized patient selection for specific IOL types, as individual visual needs and lifestyle preferences play a crucial role in determining the most suitable lens. Moreover, post-operative management and patient counseling are essential to manage patient expectations and maximize satisfaction with the chosen lens.

Keywords: Ideal Lens, Cataract Patients, Thi-Qar.

***Corresponding Author**
Ammar Adil Fahad

DOI: https://doi.org/10.37022/wjcmpr.v5i4.277

Introduction

Cataract surgery may be considered one of the most successful treatments in all of medicine. Cataracts result in a decrease in visual acuity, a reduction in contrast sensitivity, discomfort with bright light, or the appearance of a veil [1].

With continued advancements in techniques and technology, cataract surgery has evolved into a refractive procedure rather than simply a surgical treatment of cataract. Although cataract surgery is the most cost-effective intervention, its delivery in developing countries has many issues and challenges [2].

The incredible success of cataract surgery would not have been possible without the development of intraocular lenses (IOL). Intraocular lenses, or IOLs, replace the eye's natural lens that is removed during cataract surgery. IOLs have been around since the mid-1960s, though the first FDA approval for one occurred in 1981[3].

Presbyopia or astigmatism correcting IOLs is considered “premium” lenses, which means that they are an upgrade from the standard IOL. Accordingly, there is an associated additional cost. Presbyopia-correcting intraocular lenses (IOLs) including multifocal intraocular lens (MFIOLs) provide spectacle independence for both near and distance vision; they were introduced in the 1990s.

Multifocal IOLs showed superiority to monofocal IOLs in uncorrected distance visual acuity. A multifocal IOL acts like a bifocal inside the eye. It has multiple zones on the surface that will focus distance and near at all times [4-7].

Yet despite the worldwide availability of multiple IOL brands, materials, and models, not all lenses are suitable for every patient (and not all lenses are covered by health insurance companies).

Precizon Presbyopic IOL (Ophtec BV, Netherlands),

It has been designed, applying a novel optical approach. Precizon IOL is a hybrid material implant based on hydrophilic acrylic, with a hydrophobic surface modification (Benz25 material), a C-loop design with modified haptics, 12.5 mm of total diameter and a 6.00 mm optical zone. The IOL optic is designated as CTF (“continuous transitional focus”) divided into three concentric sectors: the central sector, of higher diameter, is dedicated to distance correction; two peripheral sectors present a bimodal (50–50%) distribution of distance

and near correction, and this distribution changes along four segments in each sector **(Fig. 1).** this refractive lens provides the ability for a transition in focus between 11 distinct segments (five for distance and six for near vision) within the optical zones. A CTF design creates a continuous defocus curve **(Fig. 2)** to facilitate a sharp image on the retina from infinity to intermediate, and from intermediate to near focus. Providing smoother transition allows for the potential of quicker neuroadaptation, more closely mimicking the eye's natural process of accommodation and providing a more natural-like vision [8].

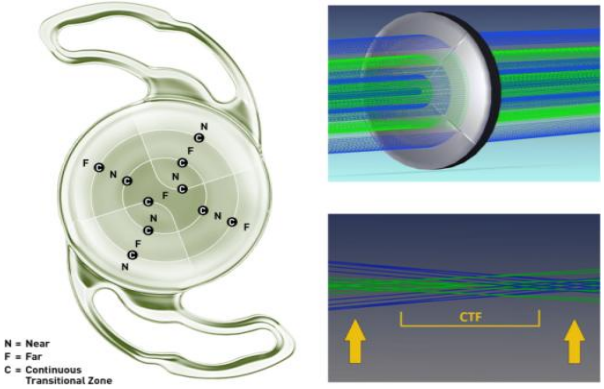

Figure 1: General overview of the Precizon CTF (Ophtec BV, Netherlands)

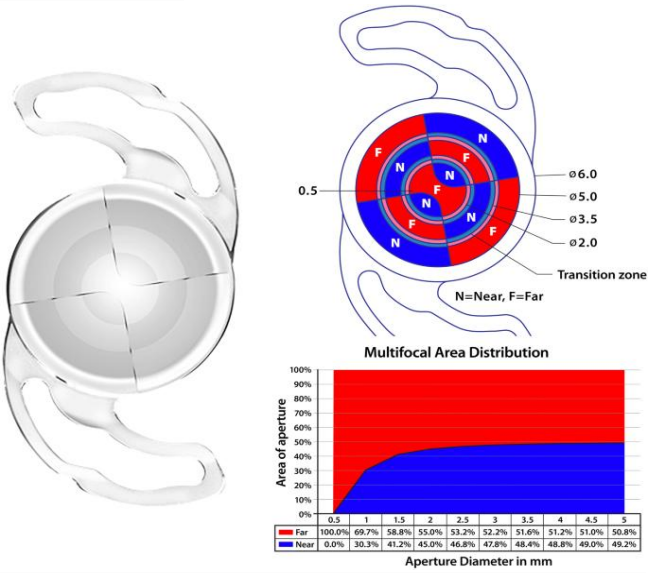

Figure 2: Details of the distribution of the Precizon CTF refractive segments and correspondent near additions according to the pupillary diameter

We compared the quality of vision and patient satisfaction of the Precizon Presbyopic IOL (Ophtec BV, Netherlands), with another type of known IOL in two groups each composed of (50) patients, the first patients group implanted by Precizon Presbyopic IOL and the second implanted by known commonly used IOL [9].

Materials and Method

Patient selection

1. Hyperopes who have significant cataracts and (high hyperopes and high myopia) with or without cataract Those patients are more likely to be satisfied with presbyopia correcting IOLs.
2. Mild myopes who have transparent crystalline lens may be dissatisfied with the result, because they often rely on their near vision for specific tasks and may have something to lose postoperatively.
3. It is important to rule out those patients who have unreasonable expectations about perfect visual needs or who have anxiety, doubt, nervousness characteristics.
4. The patients who often mention halos and glare disturb their jobs also should be rule out of the candidates.
5. People with a lot of time-consuming on near work will be some unhappy with their postoperative outcomes.

Corneal astigmatism

Is important to correct astigmatism in the premium IOLs surgery. The post-operative astigmatism should be less than 1.25 d in the eye which bifocal or trifocal IOL had been implanted. Over 1.5 diopter postoperative astigmatism is one of main reasons for patient's dissatisfaction following surgery. The larger amounts of post-operative astigmatism will cause decreasing visual function of multifocal IOLs, increasing some optical phenomena.

the keratometry, auto refraction and corneal topography/tomography are the helpful preoperative should be done preop.

Corneal and external eye disease

Preoperative evaluation and subsequent management of ocular surface disorders such as dry eye, blepharitis, and meibomium gland dysfunction greatly aids in improving visual outcomes.

Angle kappa

Angle kappa is defined as the angular distance between the pupillary axis and the visual axis. If the angle is large the light rays from an object fall at a greater distance from the fovea, resulting in glare or halos. Angle kappa acts as a contributor to photic phenomenon in eyes with refractive multifocal implants, recommending a thorough preoperative evaluation to avoid this complication. Use Ocular biometry and IOL power calculation IOLMaster (Zeiss) and Lenstar (Haag-Streit)(better) and New IOL power calculation formula Barrett

Results

Quality of visionGlare, haloes and night vision problems

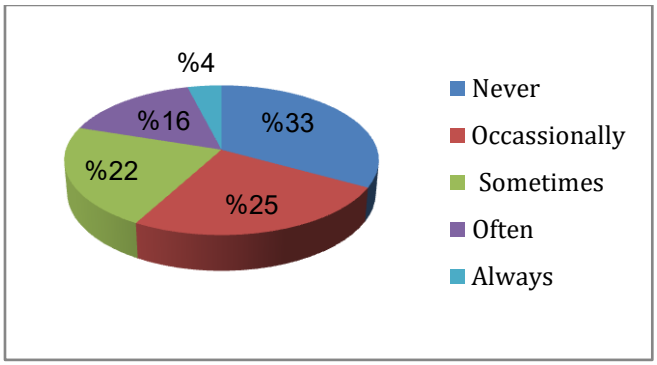

Figure 3: Show the Precizon Presbyopic IOL (Ophtec BV, Netherlands)

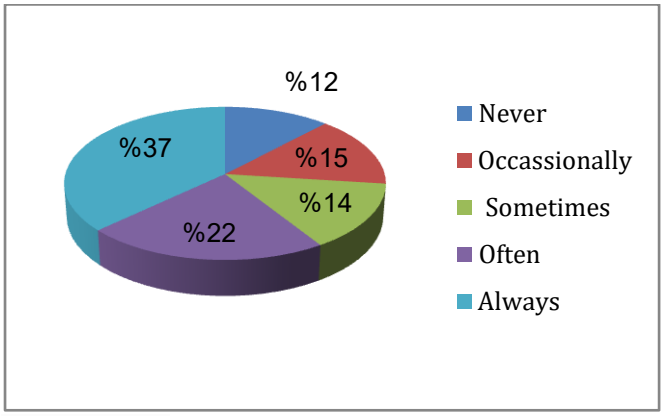

Figure 4: Show Known commonly used IOL

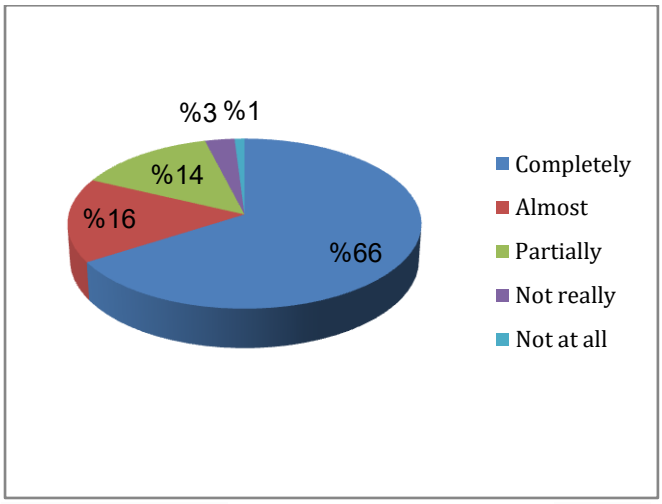

Figure 5: Show Patient satisfaction,The Precizon Presbyopic IOL (Ophtec BV, Netherlands)

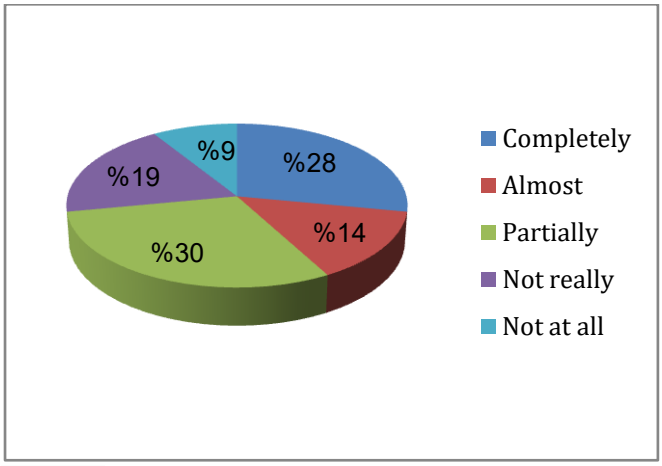

Figure 6: Show Known commonly used IOL

Comparing Spectacle independence (not needing visual correction) results between two groups of patients each (n=50)

Spectacle independence was evaluated at 3 months postoperatively by means of a patient-administered questionnaire in two groups of patients, a group treated by Precizon Presbyopia IOL while the other group treated with another type of known IOL (Fig. 7,8)

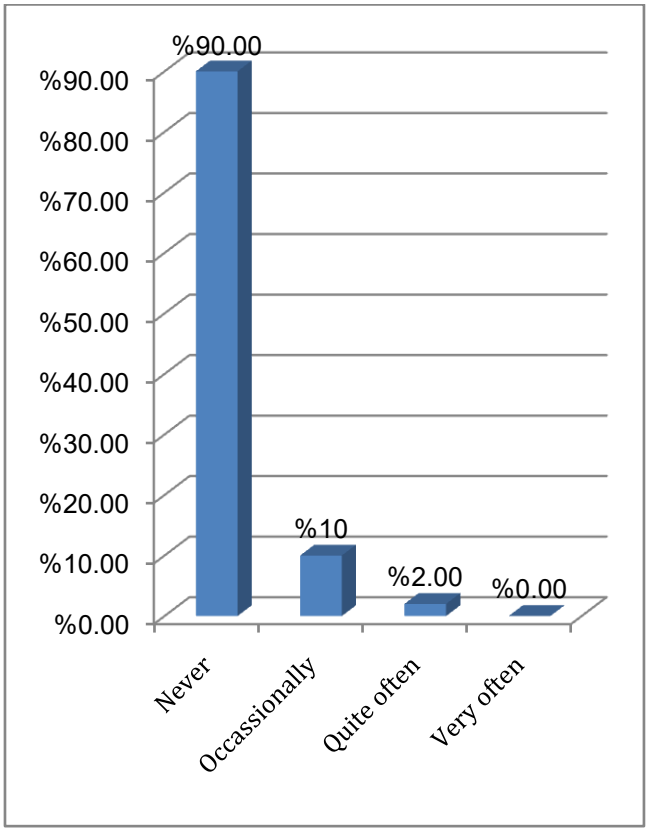

Figure 7: Show Overall spectacle independence following Precizon Presbyopia IOL implantation at postoperative 3 months by means of a questionnaire

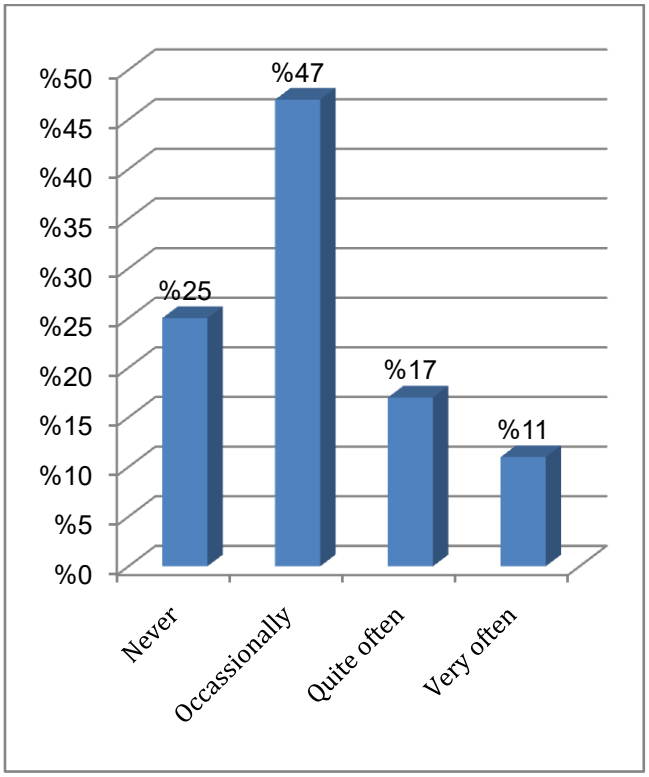

Figure 8: Overall spectacle independence following known commonly used IOL implantation at postoperative 3 months by means of a questionnaire

Discussion

The ideal intraocular lens (IOL) for cataract patients is a subject of ongoing research and debate in the field of ophthalmology. While no single lens can perfectly address the needs of every patient, advancements in lens technology have significantly improved outcomes and patient satisfaction after cataract surgery. Below, we discuss key considerations and factors that contribute to defining the ideal lens for cataract patients [10-13].

Visual Acuity: The primary goal of cataract surgery is to improve visual acuity. An ideal IOL should provide excellent vision at various distances, allowing patients to perform daily activities without significant reliance on glasses. Monofocal IOLs offer sharp vision at a fixed distance (usually either near or far), while multifocal and extended depth of focus (EDOF) lenses provide the potential for a broader range of focus [14].

Spectacle Independence: Reduced dependence on glasses is a key factor for many cataract patients. Multifocal and EDOF lenses can reduce reliance on glasses for both near and distance vision, offering greater independence. However, it's essential to consider the trade-off between spectacle independence and potential visual disturbances caused by these lenses, such as halos and glare [15].

Contrast Sensitivity: While multifocal lenses can provide spectacle independence, some patients may experience reduced contrast sensitivity and glare. This can affect vision quality, especially in low-light conditions or while driving at night. Striking a balance between spectacle independence and maintaining good contrast sensitivity is crucial when considering the ideal lens [16].

Visual Aberrations: Post-operative visual disturbances, such as halos, glares, and starbursts, can occur with certain IOLs, particularly multifocal lenses. Minimizing these aberrations is essential to improve patient satisfaction and visual comfort. Technological advancements in lens design aim to reduce these unwanted side effects [17].

Patient Lifestyle and Needs: The ideal lens varies for each patient based on their individual lifestyle, occupation, and visual demands. For example, someone with an active lifestyle and a preference for outdoor activities may benefit more from a lens with excellent distance vision, while an individual who reads extensively may prioritize near vision [18].

Astigmatism Correction: Addressing pre-existing astigmatism during cataract surgery is crucial for achieving optimal visual outcomes. Toric IOLs are designed to correct astigmatism and can significantly improve visual acuity for patients with this condition [14].

Blue-Light Filtering: Blue-light filtering IOLs have become increasingly popular due to concerns about the potential impact of blue light on retinal health. These lenses aim to protect the retina from excessive blue light exposure, which may play a role in reducing the risk of macular degeneration.

Complications and Long-Term Stability: An ideal IOL should be durable and have a low risk of complications. The long-term stability and biocompatibility of the lens material are important considerations to ensure the lens functions effectively over the patient's lifetime [19].

Why we recommend the Precizon Presbyopic IOL (Ophtec BV, Netherlands) implantation?

- The Precizon Presbyopic IOL is beneficial for many reasons; the lense has an aberration-neutral design, meaning fewer spherical aberrations and fewer visual side effects.
- One of the biggest advantages of the Precizon Presbyopic IOL compared to other commonly used lenses is the low incidence of glare, halos, and night vision problems.
- In addition, higher patient satisfaction was observed in the Precizon Presbyopic IOL (Ophtec BV, Netherlands) implantation results compared with other commonly used IOL.
- For surgeons who are hesitated to use multifocal toric IOL, the Precizon Presbyopic IOL (Ophtec BV, Netherlands) has excellent tolerance for axis misalignment and can be used more safely to improve patient vision and satisfaction.
- The Precizon Presbyopic IOL (Ophtec BV, Netherlands) is recommended for patients clear distance vision while potentially tolerating few starbursts.

Conclusion

The ideal lens for cataract patients is a multifaceted concept that considers individual visual needs, lifestyle preferences, and the latest advancements in lens technology. By offering improved visual acuity, reduced dependency on glasses, and minimal visual disturbances, these lenses contribute to enhanced quality of life and overall patient satisfaction. Continued collaboration between ophthalmologists, researchers, and lens manufacturers is essential to push the boundaries of technology and ultimately optimize cataract treatment for all affected individuals.

Recommendations

It is well established that multifocal lens implant success not only dependant on the right choice of multifocal IOLs, but also basically dependant on preoperative ocular evaluation; this helps patients in achieving better results and improve the benefit of the used multifocal IOL. The preoperative ocular evaluation including.

Funding

No Funding

Inform Consent and Ethical Statement

Not Applicable

Conflict of Interest

Author declared that no conflict of interest

References

1. Rao GN, Khanna R, Payal A (January 2011). "The global burden of cataract". Current Opinion in Ophthalmology. 22 (1): 4–9. doi:10.1097/icu.0b013e3283414fc8.
2. Mohammadpour M, Shaabani A, Sahraian A, Momenaei B, Tayebi F, Bayat R, Mirshahi R (June 2019). "Updates on managements of pediatric cataract". Journal of Current

Ophthalmology. 31 (2): 118–126. doi:10.1016/j.joco.2018.11.005.

3. Duker JS, Yanoff M (2009). Ophthalmology. St. Louis, Mo: Mosby/Elsevier. ISBN 978-0-323-04332-8.
4. Hsueh YJ, Chen YN, Tsao YT, Cheng CM, Wu WC, Chen HC. The Pathomechanism, Antioxidant Biomarkers, and Treatment of Oxidative Stress-Related Eye Diseases. Int J Mol Sci. 2022 Jan 23;23(3):1255. doi: 10.3390/ijms23031255. PMID 35163178; PMCID: PMC8835903
5. Reddy SC (1999). "Electric cataract: a case report and review of the literature". European Journal of Ophthalmology. 9 (2): 134–138. doi:10.1177/112067219900900211.
6. Ram J, Gupta R (May 2016). "IMAGES IN CLINICAL MEDICINE. Petaloid Cataract". The New England Journal of Medicine. 374 (18): e22. doi:10.1056/NEJMicm1507349.
7. Lipman RM, Tripathi BJ, Tripathi RC (1988). "Cataracts induced by microwave and ionizing radiation". Survey of Ophthalmology. 33 (3): 200–210. doi:10.1016/0039-6257(88)90088-4
8. Sliney DH (1994). "UV radiation ocular exposure dosimetry". Documenta Ophthalmologica. Advances in Ophthalmology. 88 (3–4): 243–254. doi:10.1007/bf01203678. PMID 7634993. S2CID 8242055.
9. Hejtmancik JF, Smaoui N (2003), "Molecular Genetics of Cataract", Genetics in Ophthalmology, Karger Medical and Scientific Publishers, p. 77, ISBN 978-3805575782
10. Yanoff M, Duker JS (2009), Ophthalmology, Elsevier Health Sciences, p. 507, ISBN 978-0323043328
11. Ye J, He J, Wang C, Wu H, Shi X, Zhang H, Xie J, Lee SY. (2012). "Smoking and risk of age-related cataract: a meta-analysis". Invest Ophthalmol Vis Sci. 53 (7): 3885–95. doi:10.1167/iovs.12-9820.
12. Beltrán-Zambrano E, García-Lozada D, Ibáñez-Pinilla E. (2019). "Risk of cataract in smokers: A meta-analysis of observational studies". Arch Soc Esp Oftalmol (Engl Ed). 94 (2): 60–74. doi:10.1016/j.oftal.2018.10.020.
13. Wang S, Wang JJ, Wong TY (2008). "Alcohol and eye diseases". Survey of Ophthalmology. 53 (5): 512–525. doi:10.1016/j.survophthal.2008.06.003.
14. Nave, Carl R. "Thin Lens Equation". Hyperphysics. Georgia State University. Archived from the original on 12 October 2000. Retrieved 17 March 2015.
15. Colwell, Catharine H. "Resource Lesson: Thin Lens Equation". PhysicsLab.org. Archived from the original on 2 April 2015. Retrieved 17 March 2015.
16. Proteep Mallik (2005). "The Axicon" (PDF). Archived from the original (PDF) on 23 November 2009. Retrieved 22 November 2007.
17. Grbic, A.; Eleftheriades, G. V. (2004). "Overcoming the Diffraction Limit with a Planar Left-handed Transmission-line Lens". Physical Review Letters. 92 (11): 117403. Bibcode:2004PhRvL..92k7403G. doi:10.1103/PhysRevLett.92.117403. PMID 15089166.
18. Valentine, J.; et al. (2008). "Three-dimensional optical metamaterial with a negative refractive index". Nature. 455 (7211): 376–9. Bibcode:2008Natur.455..376V. doi:10.1038/nature07247.
19. Yao, Jie; Liu, Zhaowei; Liu, Yongmin; Wang, Yuan; Sun, Cheng; Bartal, Guy; Stacy, Angelica M.; Zhang, Xiang (15 August 2008). "Optical Negative Refraction in Bulk Metamaterials of Nanowires". Science. 321 (5891): 930.